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## NATIONAL INTELLIGENCE SURVEY

## THAILAND

METEOROLOGICAL ORGANIZATION  
AND FACILITIES

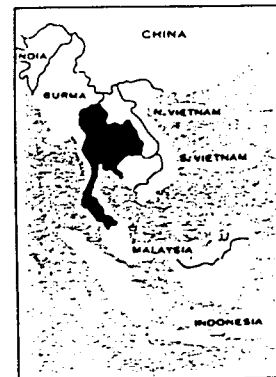
## A. GENERAL

## 1. History

Meteorology in Thailand began during the early part of the 20th century when the subject became part of the navigation course in the Royal Thai Naval Academy at the insistence of the Naval Commander in Chief, Admiral Prince Chumporn Khetr Undomsakdhi, who is generally recognized as the architect of the modern Royal Thai Navy (RTN). The admiral recognized the value of weather information in marine navigation and the need for young officers to understand its application. He taught the original course, and one of his early students, later to become Vice Admiral Phya Rajwangson, eventually wrote the first book on meteorology to be published in the Thai language. The book was subsequently used as the standard text in the naval academy.

In 1923 the Thai Navy submitted a plan to the Ministry of Land and Agriculture calling for the establishment of a national meteorological service. This plan was adopted, and a meteorological section was formed under the Department of Irrigation. A Swiss engineer and meteorologist, Mr. H. Brandi, headed the section which, at that time, consisted of a network of eight observing stations.

In 1933 two young naval officers, Lt. Charoon V. Bunnag and Lt. Charas Bonbonkar, were sent to India and to the Philippines to study meteorology. After 3 years of study, these officers returned to revise, expand, and modernize the meteorological techniques and procedures in the meteorological section of the Department of Irrigation. Their efforts eventually led to the establishment of a modern meteorological organization and to the transfer in 1936 of the meteorological section from the Department of Irrigation to the Royal Thai Navy. The new organization was called the Meteorology Division of the Hydrographic Department



of the Navy and was placed under the direction of Lt. Bunnag, who headed the division for the next 30 years.

During the period from 1936 to 1944 the Meteorology Division grew—its responsibilities broadened to include service to civil and military aviation, transportation, industry, agriculture, and commercial enterprises and to effect coordination with the meteorological services of other nations. In April 1944 the Royal Thai Government raised the status of the service to that of a department of the Royal Thai Navy with, by then, Vice Admiral Bunnag as chief. International stature and recognition came to the Thai meteorological service when Admiral Bunnag assisted in the establishment of the World Meteorological Organization (WMO) in September 1947. He also became one of the first permanent representatives to that body.

The Meteorology Department continued to flourish and expand; its growth, relatively speaking, outpaced that of its parent service. Accordingly, at the time of Admiral Bunnag's retirement in 1962, the department was removed from the control of the Thai Navy and set up as a separate department directly under the Office of the Prime Minister.

## 2. Organization

The Civil Meteorological Department (CMD) is the official name of the Thai meteorological organization. It is directly responsible to the Office of the Prime Minister and is organized into eight divisions and branches. The chief of the CMD, Vice Admiral Sanit Vesa-Rajananda, has held the

position since the reorganization in 1962. FIGURE 1 depicts the present organization as well as the names of the directors or chiefs of the various divisions and branches. It will be noted that most of the leading officials and personnel of the present department are from the Thai Navy. A brief résumé of the responsibilities of the eight divisions and branches follows:

The Office of the Secretary is responsible for all administrative functions, which include issuing rules and regulations, preparation of budgets, conducting public relations, coordination with other agencies, and representing Thailand on meteorological matters with foreign or international weather organizations.

The Observations Branch establishes and maintains the network of meteorological stations, trains personnel in observation techniques and coding methods, and handles the assignment of all observing personnel.

The Climatology Division assembles and prepares climatological summaries and statistics, processes and analyzes the data, and publishes weekly, monthly, and annual bulletins and summaries of climatological records, meteorological statistics, and scientific notes.

The Upper-air and Maritime Meteorology Division operates the upper-air stations in the country. It also collects and analyzes all upper-air and maritime data, publishes bulletins derived from such analyses, and conducts limited research on the upper atmosphere.

The Meteorological Instruments Division is responsible for the acquisition of all meteorological instruments, their calibration, distribution, and maintenance.

The Agricultural Meteorology Division deals with all aspects of weather affecting crop production and animal and human environment. It issues weekly bulletins giving the latest information on crop production. These bulletins are disseminated by the press and by radio.

The Hydrological Division maintains a network of rainfall and river-stage stations necessary to forecast and issue warnings of floods.

The Forecasting Branch is charged with all weather forecasting with the exception of that for the Thai Air Force. It is responsible for the processing and analysis of meteorological data, preparation of charts and weather forecasts, the issuance of storm warnings, and support to national and international civil aviation and other civilian interests. This branch is also responsible for all weather communications, both national and international.

Military weather support is provided by the Royal Thai Air Force (RTAF) Weather Service. The RTAF Weather Service, with headquarters at Don Muang Air Base, maintains detachments at several RTAF bases. These detachments are under the command of the local base commander. The

service is relatively small, with few adequately trained personnel, and in many instances duplicates the service provided by the Civil Meteorological Department. The RTAF Weather Service director in 1965 was Colonel Banpan Zupraviti.

## B. OBSERVING AND FORECASTING FACILITIES AND EQUIPMENT

### 1. Observing facilities

There are over 50 surface weather observing stations in Thailand, most of them are operated by the Civil Meteorological Department (CMD) and approximately 10 are operated by the USAF, the RTAF, the RTN or various combinations of these organizations (FIGURE 3). The observing stations are scattered throughout the country and provide adequate data coverage for synoptic purposes. Most of these stations are located at airfields, but only 14 of them make synoptic weather observations for all 24 hours of the day. Many of the others operate from 0700 to 2000 hours local time, taking hourly aviation and 3-hourly synoptic observations while in operation.

Five stations in Thailand measure upper-air parameters with rawinsonde equipment. Three of these, Chiangmai, Songkhla, and Bangkok, all operated by the CMD, make two observations a day at 0000Z\* and 1200Z. The stations at Ubon Ratchathani and Udon Thani, operated jointly by the USAF and CMD, make four observations a day at 0000, 0600, 1200, and 1800Z. In addition, eight stations in Thailand make winds aloft measurements, some by radar tracking and others by the pilot balloon (pibal) method. FIGURE 2 is a list of Thai synoptic weather stations, showing their schedule and type of observations.

The Thai state that they have over 500 rainfall measuring posts; data for over 300 of them are known to be published weekly. Other observations performed by the CMD are those involving solar radiation, sunshine duration, evaporation, seismological information, soil temperatures, and state of the sea.

\* Z denotes Greenwich mean time.

## 2. Forecasting facilities

The CMD maintains a major forecast and analysis center at Don Muang Airport, near Bangkok. The RTAF also operates an adjoining but separate center at the same location. The CMD center functions as a Main Meteorological Office (MMO) and provides weather forecasts for all purposes except those in support of military aviation. The office operates 24 hours a day, is responsible for the collection and dissemination of all weather information, and is a storm-warning center; it maintains a meteorological watch for the principal air routes and forecasts terminal weather conditions for the major international airports of the Far East. Surface, upper-air, and winds aloft charts for all synoptic map times are plotted and analyzed at this office.

Forecast centers are also maintained at the Dependent Meteorological Offices (DMO) located at Chiangmai and Songkhla and at the Supplementary Meteorological Office (SMO) at Udon Thani. These meteorological offices, supervised by the MMO, supply meteorological information and provide briefings for flights within the country and for flights up to 500 miles out of the country. A limited number of surface and upper-air charts are plotted and analyzed at these centers, and forecasts for the local area are prepared. These centers also relay weather information for international flights.

The Royal Thai Navy operates a forecast center at the station at Sattahip for naval and marine activities.

The MMO in Bangkok publishes daily weather maps and forecasts for use by the general public, as well as supplying forecasts for agricultural and shipping interests and government agencies. Also published by this center are weekly charts reviewing the past week's weather and giving a general outlook for the coming week.

## 3. Equipment

Most of the weather equipment in use in Thailand is of U.S. manufacture, but some of it comes from England, Germany, and Japan. As far as is known, the Thai have no capability for the manufacture of their own weather instruments or equipment. All makes of equipment are kept in satisfactory operating condition by a fairly efficient maintenance program.

Rawin and radiosonde equipment are usually maintained and their operation supervised by USAF personnel. Weather radar storm detection units are operated by the USAF at six military stations in Thailand. The CMD also operates storm detection units at four civil stations.

## C. CLIMATOLOGICAL SERVICES

The Climatology Division of the CMD is an efficient, productive office which publishes many accurate and informative climatological studies. It has limited automatic data processing capability, and an undetermined amount of data are known to be on IBM punch cards. The following are some of the publications and types of data issued on a monthly or periodic basis with a brief résumé of their contents:

- 1) *Monthly Summary of Climatological Data*—monthly climatological summaries for approximately 50 surface stations.
- 2) *Monthly Meteorological Bulletin*—a review of the past month's weather includes monthly climatological summaries for about 10 coastal stations, monthly precipitation summaries for about 80 stations, and wind roses for 2 stations. Also, hourly values of various climatic elements and monthly summaries for the station at Bangkok.
- 3) *Monthly Radiosonde Observation Data*—unabridged radiosonde observations, monthly summaries and diagrams of pressure height, temperature, and relative humidity for Bangkok at standard upper-air surfaces up to 150 millibars.
- 4) *Winds Aloft Data*—unabridged winds aloft observations for Bangkok during the month and summaries from 5 other stations for various levels to 40,000 feet. Monthly frequency tables, of simultaneous occurrence, within specified ranges, of various climatic elements of interest to aviation for four airfields.
- 5) Monthly and annual precipitation summaries for about 400 stations; monthly and annual data on river stages for about 30 stations, reviews of precipitation, tropical storm, and river stage conditions; charts showing distribution of precipitation and storm tracks.
- 6) Monthly and annual rainfall of Thailand with departures from normal for the period from 1911 to 1960.
- 7) Various other climatic publications.

## D. WEATHER COMMUNICATIONS

The Civil Meteorological Department has its main communications center in downtown Bangkok. It is a fairly well equipped center under-

going periodic improvement including a modernization program recently completed by a telecommunications expert from the Federal Republic of Germany working under WMO sponsorship. Included among the facilities at the center are radio-teletype, landline teletype, single-sideband radio, high-frequency radio, and radiotelephone. Radio-teletype, landline teletype, and single-sideband radio are used to exchange data within Thailand; radioteletype and high-frequency radio are used to enter these data in international circuits and to receive data from other countries; high-frequency radio is used to communicate with ships at sea, and radiotelephone is reserved for special purposes.

Communications for the meteorological services located at and/or servicing air force and army units are operated by the Ministry of Communications. The communication facilities at the naval bases at Sattahip and Pom Phra Chulachomklao are operated by the Royal Thai Navy. Military communication facilities are practically the same as those of the CMD.

Schedules of transmissions, call signs, frequencies, contents of weather broadcasts, and modes of transmission may be found in the World Meteorological Organization publication *Weather Reporting, Volume C: Transmissions*, WMO - No. 9. TP. 4; in the U.S. Naval Oceanographic Office publication *Radio Weather Aids*, H.O. Pub. 118; in International Civil Aviation Organization (ICAO) documents; and in appropriate USAF Air Weather Service publications.

#### E. TRAINING AND PROFICIENCY OF PERSONNEL

The CMD has an inservice training program for all of its technical personnel. The Thai language is used in all such training programs; however, most graduate forecasters and many of the observer personnel are reasonably proficient in English. Since 1963 a prerequisite for enrollment in forecasting school has been a BS degree in either physics or mathematics. Formal training is conducted at an ICAO sponsored school in Bangkok or under the auspices of the ICAO in a foreign country, usually the U.S. The ICAO forecasters' school lasts for 12 months. After graduation all forecasters receive

on-the-job training before being assigned to duty. The more promising forecasters are eligible to pursue graduate study abroad. To date, approximately 20 forecasters in the CMD have either been trained or have completed their graduate work in the U.S. All observer personnel are trained in Thailand. The formal course is 12 months long and consists of 6 months training in meteorological theory and climatology and 6 months in station operations. A high school or junior college diploma is an eligibility requirement for observers.

RTAF forecasters receive formalized on-the-job training at the Don Muang RTAF weather facilities; all must have a university degree with a science major before entering this training. Because of an increasing demand for trained personnel in the forecasting field, the RTAF is organizing a school to train noncommissioned officers as forecast assistants. RTAF student weather observers undergo a 2-year course of training which includes classes in weather observing methods and techniques, as well as courses in general science, mathematics, and English.

The U.S. Air Force under the Military Assistance Program has conducted a number of classes for RTAF weather personnel. The classes, ranging in length from 4 to 104 weeks, include such subjects as tropical meteorology, tropical analyses and forecasting, weather equipment repair, and training as weather staff officers, weather observers, and weather forecast technicians. Plans call for this military training to continue on a much smaller scale in the future.

The CMD is a well-organized and relatively efficient weather service. The naval training and development programs instituted over the years have produced a corps of well-trained, highly qualified, and devoted personnel. The RTAF Weather Service, on the other hand, is a fairly new service and has many problems and some major difficulties to overcome. Reports have indicated that jealousy and rivalry exist between it and the more efficient CMD, that much of the RTAF effort duplicates that of the CMD, and that it might be more efficient under civilian control. However, the personnel who have trained under the Military Assistance Pro-

gram and those who have been closely associated with U.S. personnel at jointly operated weather activities are well qualified and highly motivated and should form, if they remain in service, a strong nucleus for an efficient RTAF weather organization. A recent report from a qualified U.S. observer states that the RTAF Weather Service could probably operate a service sufficient to support RTAF aircraft if U.S. weathermen withdraw. However, they do not have the capability to operate and main-

tain the more sophisticated USAF equipment installed at RTAF bases supporting USAF operations.

#### F. SOURCES

Information contained in this supplement was derived from intelligence reports and from publications issued by the World Meteorological Organization and by the U.S. Naval Oceanographic Office. These sources represent the best information available.

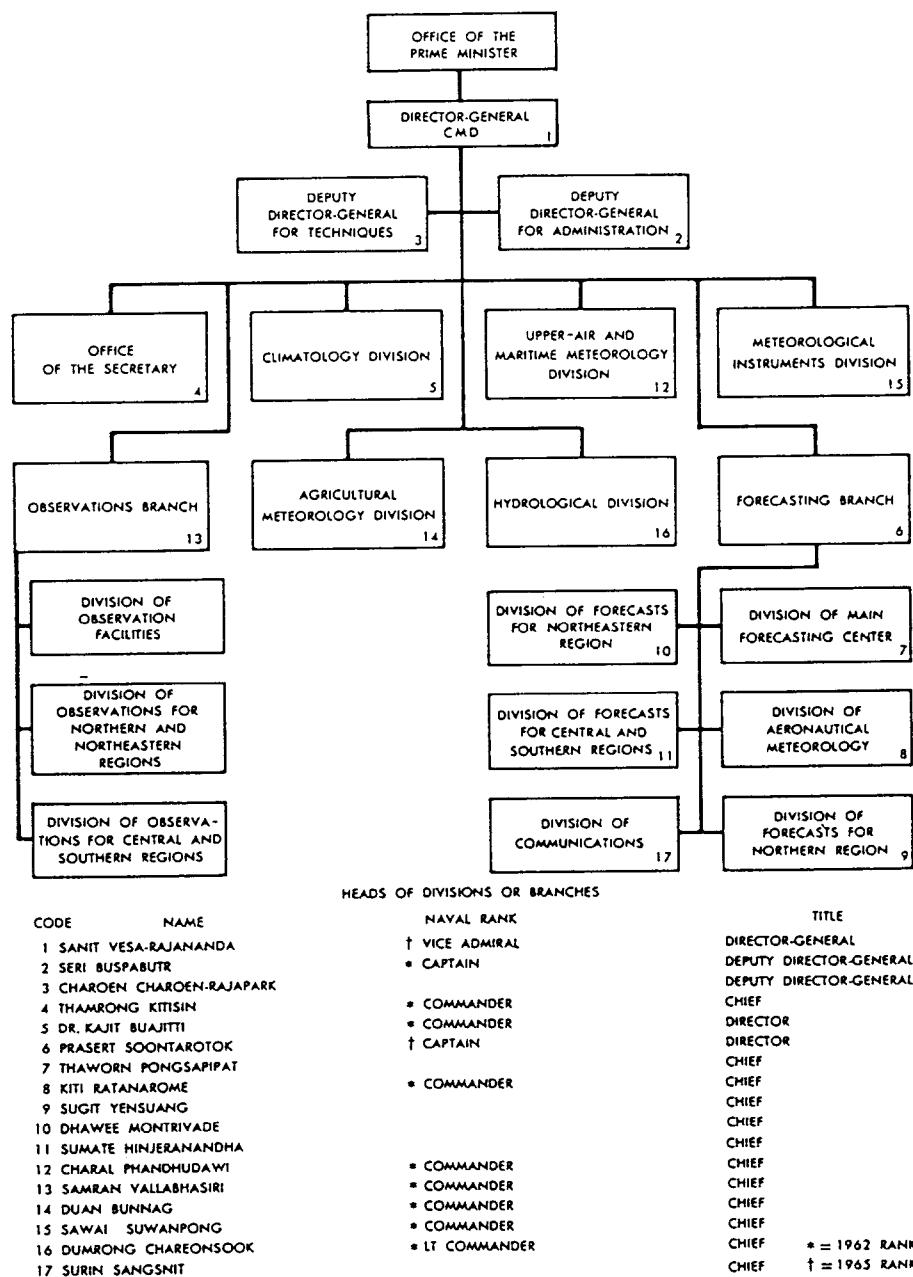


FIGURE 1. Organization of the Civil Meteorological Department

FIGURE 2. Synoptic meteorological stations in Thailand

STATION	INDEX NUMBER	LATI- TUDE	LONGI- TUDE	ELE- VATION	OBSERVATIONS (z*)												REMARKS
					Surface							Upper-air					
					00	03	06	09	12	15	18	21	00	06	12	18	
Aranyaprathet.....	**48462	13 42	102 35	144	x	x	x	x	x	x	..	..	..	..	..	..	CLIMAT, EVAP
Ban Don.....	48551	9 08	99 18	10	x	x	x	x	x	x	x	x	x	P	..	P	EVAP, SOILTEMP, SUNDUR
Bangkok.....	***48455	13 44	100 30	39	x	x	x	x	x	x	x	x	x	RW	P	RW	CLIMAT, EVAP, RSD, SOLRA, SOILTEMP, SUNDUR
Bhumibol Dam.....	**48377	17 14	99 03	538	x	x	x	x	x	x	..	..	..	..	..	..	EVAP
Chaiyaphum.....	48403	15 45	102 02	..	x	x	x	x	x	x	..	..	..	..	..	..	Do.
Chanthaburi.....	48480	12 37	102 07	16	x	x	x	x	x	x	x	x	x	P	..	P	CLIMAT, EVAP, SUNDUR, SOILTEMP
Chiang Rai.....	48303	19 55	99 50	1,365	x	x	x	x	x	x	x	x	x	..	..	..	EVAP, SUNDUR
Chiangmai.....	***48327	18 47	98 59	1,027	x	x	x	x	x	x	x	x	x	RW	P	RW	CLIMAT, EVAP, SISMO, SOILTEMP, SOLRA, SUNDUR
Chon Buri.....	48459	13 22	100 59	20	x	x	x	x	x	x	..	..	..	..	..	..	C, EVAP, SEA
Chumphon.....	48517	10 27	99 15	10	x	x	x	x	x	x	..	..	..	..	..	..	CLIMAT, EVAP, SOILTEMP
Don Muang.....	***48456	13 55	100 36	39	x	x	x	x	x	x	x	x	x	..	..	..	C, EVAP, SEA, SUNDUR
Hua Hin.....	48475	12 34	99 48	10	x	x	x	x	x	x	..	..	..	..	..	..	EVAP
Kanchanaburi.....	48450	14 01	99 32	92	x	x	x	x	x	x	..	..	..	..	..	..	C, EVAP, SEA
Khlong Yai.....	**48501	11 47	102 53	13	x	x	x	x	x	x	..	..	..	..	..	..	EVAP, SOILTEMP, SUNDUR
Khon Kaen.....	48381	16 20	102 51	515	x	x	x	x	x	x	..	..	..	..	..	..	EVAP
Khun Yuam.....	**48302	18 52	97 54	..	x	x	x	x	x	x	..	..	..	..	..	..	C, EVAP, SEA
Ko Si Chung.....	48460	13 09	100 49	85	x	x	x	x	x	x	..	..	..	..	..	..	EVAP
Lampang.....	48328	18 15	99 30	797	x	x	x	x	x	x	..	..	..	..	..	..	C, EVAP, SEA
Loei.....	48353	17 32	101 30	..	x	x	x	x	x	x	..	..	..	..	..	..	EVAP
Lop Buri.....	48426	14 48	100 37	43	x	x	x	x	x	x	..	..	..	..	..	..	EVAP, SOILTEMP, SUNDUR
Mae Hong Son.....	48300	19 18	97 50	889	x	x	x	x	x	x	x	x	x	..	..	..	EVAP, SOILTEMP
Mae Sariang.....	48325	18 10	97 50	1,030	x	x	x	x	x	x	..	..	..	..	..	..	Do.
Mae Sot.....	48375	16 40	98 33	689	x	x	x	x	x	x	..	..	..	..	..	..	Do.
Mukdahan.....	48383	16 33	104 44	453	x	x	x	x	x	x	..	..	..	P	P	P	EVAP, SOILTEMP, SOLRA, SUNDUR
Nakhon Phanom.....	***48357	17 30	104 20	459	x	x	x	x	x	x	..	..	..	..	..	..	CLIMAT, EVAP, SUNDUR, SOILTEMP
Nakhon Ratchasima...	48431	14 58	102 07	594	x	x	x	x	x	x	x	x	x	P	P	P	CLIMAT, EVAP, SUNDUR, SOILTEMP
Nakhon Sawan.....	48400	15 48	100 10	92	x	x	x	x	x	x	..	..	..	..	..	..	CLIMAT, EVAP, SOILTEMP
Nakhon Si Thammarat.	48552	8 25	99 58	16	x	x	x	x	x	x	..	..	..	..	..	..	EVAP
Nan.....	48331	18 47	100 47	660	x	x	x	x	x	x	..	..	..	..	..	..	C, EVAP, SEA
Narathiwat.....	48583	6 26	101 50	13	x	x	x	x	x	x	..	..	..	..	..	..	EVAP
Pai.....	**48301	19 20	98 27	1,772	x	x	x	x	x	x	..	..	..	..	..	..	EVAP, SOILTEMP
phetchabun	48379	16 25	101 08	374	x	x	x	x	x	x	..	..	..	P	..	..	

Footnotes are at end of table.

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FIGURE 2. Synoptic meteorological stations in Thailand (Continued)

STATION	INDEX NUMBER	LATI- TUD E	LONGI- TUD E	ELE- VATION	OBSERVATIONS (z*)												REMARKS	
					Surface						Upper-air							
					00	03	06	09	12	15	18	21	00	06	12	18		
Phitsanulok.....	***48378	16 50	100 16	164	x	x	x	x	x	x	x	x	x	P	P	P	..	CLIMAT, EVAP, SUNDUR, SOILTEMP
Phrae.....	48330	18 10	100 08	515	x	x	x	x	x	x	..	..	..	..	..	..	..	Do.
Phuket.....	48564	7 58	98 24	10	x	x	x	x	x	x	..	..	..	..	..	..	..	C, SEA, SUNDUR
Phuket Airport.....	48565	8 08	98 19	..	x	x	x	x	x	x	..	..	..	P	..	..	..	C, EVAP, SEA
Pom Phra Chulachom- kiao.	**48457	13 32	100 35	10	x	x	x	x	x	x	..	..	..	..	..	..	..	EVAP, SOILTEMP
Prachin Buri.....	48430	14 10	101 10	23	x	x	x	x	x	x	..	..	..	..	..	..	..	C, CLIMAT, EVAP, SEA
Prachuap Khiri Khan..	48500	11 48	99 48	16	x	x	x	x	x	x	..	..	..	P	..	..	..	EVAP
Ranong.....	48532	9 58	98 38	26	x	x	x	x	x	x	..	..	..	..	..	..	..	EVAP, SUNDUR
Roi Et.....	48405	16 03	103 41	459	x	x	x	x	x	x	..	..	..	..	..	..	..	Do.
Sakon Nakhon.....	48356	17 10	104 09	525	x	x	x	x	x	x	..	..	..	..	..	..	..	C, EVAP, SEA
Sattahip (RTN).....	**48477	12 39	100 53	180	x	x	x	x	x	x	x	x	x	RW	P	RW	P	C, CLIMAT, EVAP, SEA, SOLRA, SUNDUR, SOILTEMP
Songkhla.....	***48568	7 11	100 37	33	x	x	x	x	x	x	x	x	x	..	..	..	..	EVAP
Suphan Buri.....	48425	14 30	100 10	23	x	x	x	x	x	x	..	..	..	..	..	..	..	EVAP, SOILTEMP, SUNDUR
Surin.....	48432	14 53	103 29	476	x	x	x	x	x	x	..	..	..	..	..	..	..	EVAP
Tak.....	48376	16 51	99 07	377	x	x	x	x	x	x	..	..	..	..	..	..	..	Do.
Trang.....	48567	7 30	99 40	39	x	x	x	x	x	x	..	..	..	..	..	..	..	CLIMAT, EVAP, SUNDUR, SOILTEMP
Ubon Ratchathani.....	***48407	15 15	104 53	417	x	x	x	x	x	x	x	x	x	RW	RW	RW	RW	Do.
Udon Thani.....	***48354	17 26	102 46	584	x	x	x	x	x	x	x	x	x	RW	RW	RW	RW	EVAP
Uttaradit.....	48351	17 37	100 08	207	x	x	x	x	x	x	..	..	..	..	..	..	..	

\* Z denotes Greenwich mean time.

\*\* Rarely included in weather broadcasts.

\*\*\* Hourly observations made.

Abbreviations:

P..... Winds aloft observation only.

C..... Coastal station.

RW..... Upper-air and upper-wind observations.

SEA..... State of sea reports.

RSID..... Radar storm detectors.

EVAP..... Evaporation measurements.

SOLRA..... Solar radiation measurements.

SISMO..... Seismological observations.

SUNDUR..... Sunshine duration totals.

CLIMAT..... Climatic summaries transmitted.

SOILTEMP..... Soil temperature measurements.

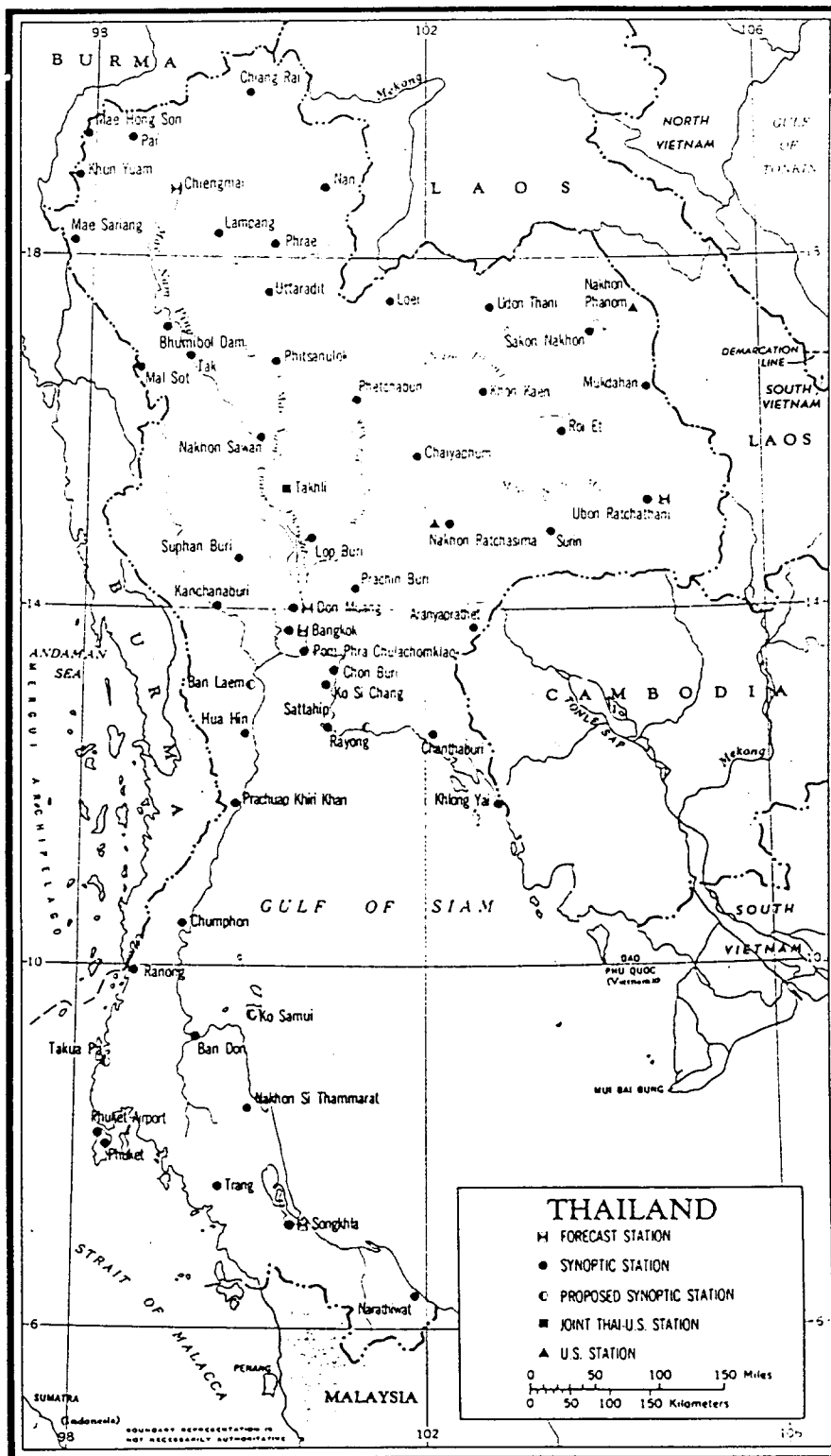


FIGURE 3. Weather stations of Thailand

*This section was prepared for the NIS by the  
Defense Intelligence Agency.*